A STUDY ON THE EVALUATION OF SOME GRAPE CULTIVARS GROWN IN RECLAIMED LAND

Hatem Hamdy Saied Aly\textsuperscript{1}, Mohammed El-Sayed Morsy Essa\textsuperscript{2}, Hamdy Abdel Nabi Zaki Hussein\textsuperscript{1} and Mohamed Abdel Aziz Abdel Wahab\textsuperscript{2}

\textsuperscript{1}Faculty of Agriculture, Fayoum University, Fayoum, Egypt.
\textsuperscript{2}Horticulture Research Institute, Agricultural Research Center, Giza, Egypt.

ABSTRACT

This investigation was conducted for two successive seasons (2016 and 2017) in a private vineyard located at 58 km Cairo-Alex desert road to evaluate vegetative growth, yield and fruit quality for three seeded grape varieties of the \textit{V. vinifera} grapes namely: Black Rose; Matrouh Eswed and Ribier. The chosen vines were eight-year-old, spaced at 2 X 2.75 meters apart, grown in a sandy loam soil and irrigated by the drip irrigation system. Vines were cane pruned and trellised by the Spanish Parron system. The vines were pruned during the 2\textsuperscript{nd} week of January for the two seasons of the study so as to maintain a load of 84 buds/vine (7 canes X 12 buds/vine).

The results revealed that Matrouh Eswed grape cultivar had significantly the highest values of vegetative growth aspects (expressed as shoot length, shoot diameter, number of leaves per shoot, leaf area and weight of prunings) and leaf content of plant pigments including chlorophyll a & b and carotenoids compared to other grape cultivars. Concerning to leaf and cane content of total carbohydrates and mineral elements, it is noticed that Black Rose grape cultivar induced significantly the highest magnitude of total carbohydrates and macro-elements i.e. nitrogen, phosphorus and potassium, while Matrouh Eswed grape cultivar resulted in the highest magnitude of micro-elements i.e. iron, zinc and manganese. With respect to yield and its attributes, it is mentioned that Black Rose grape cultivar had significantly the highest values of yield/vine, cluster weight, cluster length, cluster width and number of berries/cluster, whereas Matrouh Eswed grape cultivar induced significantly the highest values of number of clusters/vine. As for physical and chemical characteristics of berries, it is noticed that Black Rose grape cultivar had significantly the highest values of all physical characteristics including berry weight, size, length and diameter, while Matrouh Eswed grape cultivar resulted in the highest values of chemical characteristics except total anthocyanin in berry skin including TSS, total sugars, reducing sugars and non-reducing sugars and the least values of acidity. On the hand, Black Rose grape cultivar induced significantly the highest magnitude of total anthocyanin in berry skin.

Keywords: grape, Black Rose; Matrouh Eswed and Ribier.

INTRODUCTION

The grape (\textit{Vitis L.}), which has a long history of cultivation and utilization, is one of the most important commercial fruit crops worldwide. There are more than 70 grape species and a large number of grape cultivars growing all over the world (Jing, 1999). Grapes belong to the family \textit{Vitaceae}, cultivated originally in Asia, in addition to minor grows in south Europe, North Africa and Middle East (Chopra \textit{et al}., 1970).

Grape is considered as one of the most important fruit crops in the world. In Egypt, grape occupies the second rank after citrus. The total grape area in Egypt reached 196993 feddans with production of 1686706 Tons according to the latest statistics of Ministry of Agriculture (2015). Thirty years ago most of the grape area has been occu-
plied by two main cultivars: Thompson seedless and Roumi Ahmer besides a small area cultivated with some local cultivars. In 1981 Ministry of Agriculture through the Agriculture Development system project A.D.S. introduced some new table grape cultivars which have been planted in different growing regions in Delta and desert areas; these cultivars were found to have different morphological characteristics and bunch quality.

Cultivars can be characterized by several methods: (1) Morphological description of parts of the plants (shoots, leaves, bunches, berries, etc.) at different phonological stages (Olv, 1984). (2) Morphometry based on the measurement of parameters of plant organs and Phenological dates, i.e. dates of budburst and harvesting (Galet, 1952 and Cabello et al. 1993). (3) Analysis of biochemical compounds either quantitatively or qualitatively. These examinations of some grapevine parameters remain the most important and easiest means for the identification of grape species, varieties and clones (Schneider, 1996).

Pervious trials dealt with the description and evaluation of grape cultivars (Olmo, 1946; Kamel, 1985; Winkler et al., 1965; Brooks and Olmo 1972; Watt, 1983; Walker and Boursiquote, 1992; Abd El-Kawi and El-Yam, 1992 a, b and c; Abd El-Fatah and Kastor, 1993 a and b; Morrison, 1994; Tourky et al., 1995; El Sharkawy 1995; Fawzy 1998; Aisha et al., 1998; Marwad, 2002 a and b; Gaser, 2006; Girgis 2007; Sabry et al., 2009; Abd El-Wahab, 2011; Abd El-Rahman, 2016; El-Morsy et al., 2017; Mohamed and Khairy 2017 and Sharma et al., 2017).

The goal of the present study was to evaluate vegetative growth, yield and its attributes and berry quality for three seeded grape varieties of the V. vinifera grapes namely: Black Rose; Matrouh Eswed and Ribier.

MATERIALS AND METHODS

This investigation was conducted for two successive seasons (2016 and 2017) in a private vineyard located at 58 km Cairo-Alex desert road to evaluate vegetative growth, yield and cluster quality for three seeded grape varieties of the V. vinifera grapes namely: Black Rose; Matrouh Eswed and Ribier. The chosen vines were eight-year-old, spaced at 2 X 2.75 meters apart, grown in a sandy loam soil and irrigated by the drip irrigation system. Vines were cane pruned and trellised by the Spanish Parron system. The vines were pruned during the 2nd week of January for the two seasons of the study so as to maintain a load of 84 buds/vine (7canes X 12 buds/vine). Three replicates for each cultivar were taken where each replicate consisted of five vines. All the varieties and their morphological characteristics for clusters are illustrated in Figure, 1.

![Figure 1: Morphological characteristics for clusters and seeds of some table grape varieties](image-url)
The following parameters were adopted to evaluate for the tested varieties:

1) Morphological characteristics of vegetative growth:
At growth cessation, the following morphological parameters were carried out on three fruitful shoots / the considered vine:
   a) Average main shoot length (cm.) as a result of measuring the length of the ten main shoots per vine and then the average was estimated.
   b) Average main shoot diameter (cm.) as a result of measuring the diameter of the ten main shoots per vine and then the average was estimated.
   c) Average number of leaves as a result of measuring the number of leaves on the ten main shoot / vine and then the average was estimated.
   d) Average leaf area (cm²) as a result of twenty mature leaves from those opposite to the basal clusters on the main shoot / vine and measured by using a CI-203- Laser Area-meter made by CID, Inc., Vancouver, USA.
   e) Weight of prunings (Kg) as a result of measuring the Weight of prunings / vine and then the average was estimated at dormancy period (winter pruning).

2) Chemical characteristics of vegetative growth:
   a) Leaf content of plant pigments (mg/ 100 g./F.W)
   Samples of five mature and fresh leaves from those leaves opposite to the basal clusters on each shoot were taken at full bloom during both seasons and determine chlorophyll A & B and total carotenoids according to Wettstein (1957).
   b) Leaf and cane content of total carbohydrates (%) and mineral elements:
   Samples of five mature and fresh leaves from the main shoots opposite to the basal clusters according to (Balo et al., 1988) for each vine were taken at full bloom in both seasons. Blades of the leaves were discarded and petioles were saved. During the dormancy period (the last week of January)
      ▪ Total carbohydrates (%) was determined colorimetrically at 490-mu wave length, using the phenol sulfuric acid method described by (Smith et al., 2007).
      ▪ Nitrogen content (%) was determined in the digested solution by the modified microkjeldahl method as described by Plummer (1971).
      ▪ Phosphorus content (%) was determined colorimetrically according to the method of Jackson (1967).
      ▪ Potassium content (%) was determined against a standard using flame-photometer as described by Piper (1950).
      ▪ Iron, zinc and manganese content (ppm) was determined by using Atomic Absorption Spectrophotometer, Pye unican SP1900, according to Brandifeld and Spincer (1965).

3) Yield and its attributes:
Harvesting took place when TSS reached about 16-17% according to Tourky et al., (1995). Representative random samples of six clusters / vine were harvested at maturity and brought to the laboratory for the following determinations:
   a) Yield / vine (kg) was determined as number of clusters / vine X average cluster weight (g).
   b) Average cluster weight (g).
   c) Average cluster length (cm).
   d) Average cluster width (cm).
   e) Number of berries
4) Physical and chemical characteristics of berries

Fifty berries from each cluster were taken at random for determination of the following physical and chemical characteristics.

a) Average berry weight (g)
b) Average berry size (cm3)
c) Average berry dimensions (longitudinal and equatorial, in cm).
d) Percentage of total soluble solids in the juice by using Hand refractometer.
e) Percentage of total acidity (as a tartaric acid/ 100 ml juice) by titration against 0.1 NaOH using phenolphthalein as an indicator A.O.A.C. (2012).
f) Percentage of total sugars (Reducing – Non-reducing) in the juice by Miller (1972) as described in A.O.A.C. (2012).
g) Total anthocyanin of the berry skin (mg/100g fresh weight) was determined according Husia et al., (1965).

Statistical analysis:

The completely randomized design was adopted for this investigation. The obtained data were statistically analyzed according to Snedecor and Cochran (1990). The new LSD values at 5% level were taken as a measure for comparing among means of treatments.

RESULTS AND DISCUSSION

1. Morphological characteristics of vegetative growth

Data in Table 1 found that most of vegetative growth aspects (expressed as shoot length, shoot diameter, number of leaves per shoot, leaf area and weight of prunings) were affected by type of cultivar in both seasons.

Average shoot length

Data in Table 1 show that Matrouh Eswed grape cultivar had significantly the highest average shoot length followed by Ribier grape cultivar, while Black Rose grape cultivar resulted in significantly the shortest one in both seasons.

These results are in accordance with Ismail (1989) who found that the highest average shoot length was obtained from Cardinal cv. (99.2cm) followed by Emerald Seedless cv. (92.8cm) followed by Queen cv. (86.8cm) while Beauty Seedless cv. gave the lowest average shoot length (79.7cm). Also, Fawzy (1998) showed the highest average shoot length was obtained from Black Monukka cv. (128.6cm) followed by Ruby Seedless cv. (122.1cm) followed by Ribier cv. (116.1cm) while Gold cv. gave the lowest average shoot length (81.0cm).

Average shoot diameter

Results in Table 1 clarify that the narrowest average shoot diameter was significantly attained by Black Rose grape cultivar, whereas Matrouh Eswed grape cultivar induced significantly the highest average shoot diameter followed by Ribier grape cultivar in both seasons.

The obtained results are in agreement with those reported by Ismail (1989) who found that the highest average shoot diameter was obtained from Beauty Seedless cv. (3.21cm) followed by Emerald Seedless cv. (2.49cm) followed by Queen cv. (2.24cm) while Cardinal cv. gave the lowest average shoot diameter (2.19cm). In addition, Fawzy (1998) showed that the highest average shoot diameter was obtained from Black Monukka and Ruby Seedless cvs. (2.80cm) followed by Queen Cv. (2.70cm) followed by Ribier cv. (2.69cm) while Perlette cv. gave the lowest average shoot diameter (1.61cm).
Table (1): Morphological characteristics of vegetative growth of some table grape cultivars in 2016 and 2017 seasons

<table>
<thead>
<tr>
<th>Character</th>
<th>Shoot length (cm)</th>
<th>Shoot diameter (cm)</th>
<th>Number of leaves</th>
<th>Leaf area (cm²)</th>
<th>Weight of prunings (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Rose</td>
<td>1.13</td>
<td>0.71</td>
<td>16.4</td>
<td>157.2</td>
<td>1.13</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>1.48</td>
<td>0.96</td>
<td>21.3</td>
<td>175.1</td>
<td>1.89</td>
</tr>
<tr>
<td>Ribier</td>
<td>1.44</td>
<td>0.78</td>
<td>20.8</td>
<td>169.5</td>
<td>1.62</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.03</td>
<td>0.17</td>
<td>0.4</td>
<td>5.3</td>
<td>0.23</td>
</tr>
<tr>
<td>Season, 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>1.19</td>
<td>0.75</td>
<td>16.9</td>
<td>162.7</td>
<td>1.25</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>1.57</td>
<td>1.04</td>
<td>21.5</td>
<td>178.3</td>
<td>2.07</td>
</tr>
<tr>
<td>Ribier</td>
<td>1.49</td>
<td>0.83</td>
<td>21.1</td>
<td>173.2</td>
<td>1.71</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.07</td>
<td>0.19</td>
<td>0.3</td>
<td>4.7</td>
<td>0.27</td>
</tr>
<tr>
<td>Season, 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average number of leaves per shoot

Data in Table 1 show that Matrouh Eswed grape cultivar had significantly the highest average number of leaves per shoot followed by Ribier grape cultivar, while Black Rose grape cultivar attained significantly the least average number of leaves per shoot in both seasons.

These results are in line with Ismail (1989) who found that the highest number of leaves/shoot was obtained from Queen cv. (24.16 leaves/shoot) followed by Emerald Seedless cv. (23.02 leaves/shoot) followed by Beauty Seedless cv. (21.28 leaves/shoot) while Cardinal cv. gave the lowest number of leaves/shoot (18.62 leaves/shoot). Also, Fawzy (1998) showed that the highest number of leaves/shoot was obtained from Black Monukka cv. (22.3 leaves/shoot) followed by Ruby Seedless cv. (20.0 leaves/shoot) followed by Queen Cv. (18.3 leaves/shoot), while Gold cv. gave the lowest number of leaves/shoot (14.8 leaves/shoot).

Average leaf area

Results in Table 1 show that the smallest leaf area was obtained with Black Rose grape cultivar, whereas Matrouh Eswed grape cultivar recorded significantly the largest average leaf area followed by Ribier grape cultivar in both seasons.

These results are in accordance with Ismail (1989) who found that the highest average leaf area was obtained from Queen cv. (126.8cm²) followed by Emerald Seedless cv. (117.7cm²) followed by Cardinal cv. (113.2cm²) while Beauty Seedless cv. gave the lowest average leaf area (109.1cm²). Also, Fawzy (1998) showed that the highest average leaf area was obtained from Black Monukka cv. (165.2cm²) followed by Ribier cv. (128.8cm²) followed by Queen Cv. (127.9cm) while Perlette cv. gave the lowest average leaf area (113.4cm²).

Average weight of prunings

Data in Table 1 show that Matrouh Eswed grape cultivar had significantly the highest average weight of prunings followed by Ribier grape cultivar, while Black Rose grape cultivar resulted in significantly the least one in both seasons.

The obtained results are in agreement with those reported by Marwad (2002) who found that the heaviest prunings resulted from Black Monukka cv. (2.61kg/vine)
followed by Ruby Seedless cv. (1.97 kg/vine) followed by Beauty Seedless cv. (1.84 kg/vine) while the lightest pruning were obtained in Emerald Seedless cv. (1.46 kg/vine). Also, Gaser (2006) showed that the highest vigour was obtained from Crimson Seedless cv. vines (5.93 kg/vine) followed by Christmas Rose cv. vines (4.44 kg/vine) followed by Fantasy cv. vines (3.90 kg/vine) while Red Globe cv. vines characterized by having low vigour (2.48 kg/vine). In addition, Sabry et al., (2009) mentioned that the highest weight of prunings was obtained from Black Monukka cv. (3.33 kg/vine) followed in a descending order by Rich Baba cv. (2.75 kg/vine), then Queen cv. (2.68 kg/vine) while Red Globe cv. gave the lowest weight of prunings (2.05 kg/vine).

2. Chemical characteristics of vegetative growth

As shown in Tables 2, 3 & 4, it is evident from the data that, all of the determined chemicals (expressed as leaf content of plant pigments and leaf and cane content of total carbohydrates and mineral elements) were influenced by type of cultivar in both seasons.

Leaf content of plant pigments

Chlorophyll a

Results in Table 2 clarify that the least leaf content of chlorophyll a was significantly attained by Black Rose grape cultivar, whereas Matrouh Eswed grape cultivar induced significantly the highest leaf content of chlorophyll a followed by Ribier grape cultivar with insignificant differences were attributed between them in both seasons.

Chlorophyll b

Data in Table 2 show that Matrouh Eswed grape cultivar had significantly the highest leaf content of chlorophyll b followed by Ribier grape cultivar with insignificant differences were attributed between them, while Black Rose grape cultivar attained significantly the least leaf content of chlorophyll b in both seasons.

Carotenoids

Results in Table 2 found that the least leaf content of carotenoids was obtained with Black Rose grape cultivar, whereas Matrouh Eswed grape cultivar recorded significantly the highest leaf content of carotenoids followed by Ribier grape cultivar with insignificant differences were attributed between them in both seasons.
Table (2): Leaf content of plant pigments of some table grape cultivars in 2016 and 2017 seasons

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Chlorophyll (A) (mg/100g)</th>
<th>Chlorophyll (B) (mg/100g)</th>
<th>Carotenoids (mg/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Season, 2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>22.47</td>
<td>13.67</td>
<td>8.93</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>24.29</td>
<td>15.52</td>
<td>9.51</td>
</tr>
<tr>
<td>Ribier</td>
<td>23.54</td>
<td>14.94</td>
<td>9.23</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.77</td>
<td>0.59</td>
<td>0.31</td>
</tr>
<tr>
<td>Season, 2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>22.56</td>
<td>14.02</td>
<td>9.17</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>24.38</td>
<td>15.89</td>
<td>9.64</td>
</tr>
<tr>
<td>Ribier</td>
<td>23.67</td>
<td>15.13</td>
<td>9.42</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.72</td>
<td>0.78</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Leaf content of total carbohydrates and mineral elements

Total carbohydrates

Data in Table 3 show that Black Rose grape cultivar had significantly the highest leaf content of total carbohydrates followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar resulted in significantly the least magnitude in both seasons.

Nitrogen

Results in Table 3 clarify that the least leaf content of nitrogen was significantly attained by Ribier grape cultivar, whereas Black Rose grape cultivar induced significantly the highest magnitude followed by Matrouh Eswed grape cultivar in both seasons.

Phosphorus

Data in Table 3 found that Black Rose grape cultivar had significantly the highest leaf content of phosphorus followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar attained significantly the least magnitude in both seasons.

Potassium

Results in Table 3 show that the least leaf content of potassium was obtained with Ribier grape cultivar, whereas Black Rose grape cultivar recorded significantly the highest magnitude followed by Matrouh Eswed grape cultivar in both seasons.

Iron

Data in Table 3 found that Matrouh Eswed grape cultivar had significantly the highest leaf content of iron followed by Black Rose grape cultivar with insignificant differences were attributed between them, while Ribier grape cultivar resulted in significantly the least magnitude in both seasons.

Zinc

Results in Table 3 clarify that the least leaf content of zinc was significantly attained by Ribier grape cultivar, whereas Matrouh Eswed grape cultivar induced significantly the highest magnitude followed by Black Rose grape cultivar with insignificant differences were attributed between them, in both seasons.
Manganese

Data in Table 3 found that Matrouh Eswed grape cultivar had significantly the highest leaf content of manganese followed by Black Rose grape cultivar with insignificant differences were attributed between them, while Ribier grape cultivar attained significantly the least magnitude in both seasons.

Table (3): Leaf content of total carbohydrates and mineral elements of some table grape cultivars in 2016 and 2017 seasons

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Total carbohydrates (%)</th>
<th>N (%)</th>
<th>P (%)</th>
<th>K (%)</th>
<th>Fe (ppm)</th>
<th>Zn (ppm)</th>
<th>Mn (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Season, 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>14.2</td>
<td>1.49</td>
<td>0.31</td>
<td>0.54</td>
<td>223.2</td>
<td>157.1</td>
<td>189.4</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>13.8</td>
<td>1.43</td>
<td>0.27</td>
<td>0.49</td>
<td>239.4</td>
<td>163.8</td>
<td>193.7</td>
</tr>
<tr>
<td>Ribier</td>
<td>12.9</td>
<td>1.35</td>
<td>0.24</td>
<td>0.47</td>
<td>217.9</td>
<td>139.3</td>
<td>177.2</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.3</td>
<td>0.05</td>
<td>0.03</td>
<td>0.04</td>
<td>17.3</td>
<td>7.6</td>
<td>4.7</td>
</tr>
<tr>
<td>Season, 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>14.7</td>
<td>1.57</td>
<td>0.35</td>
<td>0.63</td>
<td>229.3</td>
<td>162.9</td>
<td>191.1</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>14.1</td>
<td>1.48</td>
<td>0.28</td>
<td>0.55</td>
<td>245.6</td>
<td>167.4</td>
<td>197.5</td>
</tr>
<tr>
<td>Ribier</td>
<td>13.5</td>
<td>1.42</td>
<td>0.26</td>
<td>0.51</td>
<td>221.7</td>
<td>148.7</td>
<td>178.3</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.5</td>
<td>0.07</td>
<td>0.04</td>
<td>0.06</td>
<td>17.6</td>
<td>5.1</td>
<td>8.3</td>
</tr>
</tbody>
</table>

Cane content of total carbohydrates and mineral elements

Total carbohydrates

Results in Table 4 show that the least cane content of total carbohydrates was obtained with Ribier grape cultivar, whereas Black Rose grape cultivar recorded significantly the highest magnitude followed by Matrouh Eswed grape cultivar in both seasons.

These results are in line with Fawzy (1998) who found that the highest cane content of total carbohydrates was obtained from Ruby Seedless cv. (23.37%) followed by Ribier cv. (21.17%) followed by Black Monukka cv. (19.75%) while Gold cv. gave the lowest cane content of total carbohydrates (16.79%).

Nitrogen

Data in Table 4 found that Black Rose grape cultivar had significantly the highest cane content of nitrogen followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar resulted in significantly the least magnitude in both seasons.

Phosphorus

Results in Table 4 clarify that the least cane content of phosphorus was significantly attained by Ribier grape cultivar, whereas Black Rose grape cultivar induced significantly the highest magnitude followed by Matrouh Eswed grape cultivar with insignificant differences were attributed between them in both seasons.

Potassium

Data in Table 4 found that Black Rose grape cultivar had significantly the highest cane content of potassium followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar attained significantly the least magnitude in both seasons.
Iron

Results in Table 4 show that the least cane content of iron was obtained with Ribier grape cultivar, whereas Matrouh Eswed grape cultivar recorded significantly the highest magnitude followed by Black Rose grape cultivar with insignificant differences were attributed between them in both seasons.

Zinc

Data in Table 4 found that Matrouh Eswed grape cultivar had significantly the highest cane content of zinc followed by Black Rose grape cultivar with insignificant differences were attributed between them, while Ribier grape cultivar resulted in significantly the least magnitude in both seasons.

Manganese

Results in Table 4 clarify that the least cane content of manganese was significantly attained by Ribier grape cultivar, whereas Matrouh Eswed grape cultivar induced significantly the highest magnitude followed by Black Rose grape cultivar with insignificant differences were attributed between them in both seasons.

### Table (4): Cane content of total carbohydrates and mineral elements of some table grape cultivars in 2016 and 2017 seasons

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Total carbohydrates (%)</th>
<th>N (%)</th>
<th>P (%)</th>
<th>K (%)</th>
<th>Fe (ppm)</th>
<th>Zn (ppm)</th>
<th>Mn (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Season, 2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>23.9</td>
<td>1.34</td>
<td>0.22</td>
<td>0.41</td>
<td>156.7</td>
<td>37.4</td>
<td>113.8</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>21.4</td>
<td>1.31</td>
<td>0.19</td>
<td>0.37</td>
<td>172.8</td>
<td>43.7</td>
<td>119.4</td>
</tr>
<tr>
<td>Ribier</td>
<td>18.7</td>
<td>1.26</td>
<td>0.17</td>
<td>0.34</td>
<td>94.9</td>
<td>35.2</td>
<td>103.9</td>
</tr>
<tr>
<td>new L.S.D. (0.05)</td>
<td>2.3</td>
<td>0.02</td>
<td>0.01</td>
<td>0.03</td>
<td>18.1</td>
<td>7.2</td>
<td>6.1</td>
</tr>
<tr>
<td><strong>Season, 2017</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>24.3</td>
<td>1.29</td>
<td>0.26</td>
<td>0.44</td>
<td>162.8</td>
<td>41.2</td>
<td>118.2</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>21.9</td>
<td>1.27</td>
<td>0.21</td>
<td>0.39</td>
<td>181.3</td>
<td>48.9</td>
<td>123.7</td>
</tr>
<tr>
<td>Ribier</td>
<td>19.2</td>
<td>1.23</td>
<td>0.18</td>
<td>0.37</td>
<td>114.7</td>
<td>37.4</td>
<td>106.3</td>
</tr>
<tr>
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<td>2.1</td>
<td>0.01</td>
<td>0.03</td>
<td>0.04</td>
<td>18.9</td>
<td>8.3</td>
<td>6.7</td>
</tr>
</tbody>
</table>

3. Yield and its attributes

Data in Table 5 show that yield and its attributes (expressed as yield/vine, number of clusters/vine, cluster weight, cluster length, cluster width and number of berries) were affected by type of cultivar in both seasons. Variation in yield and yield contributing parameters recorded in the study are due to genetic makeup.

Yield/vine

Data in Table 5 found that Black Rose grape cultivar had significantly the highest yield/vine followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar attained significantly the least yield/vine in both seasons.

These results are in accordance with Abd El-Wahab (2011) who found that the highest yield was obtained from Melissa cv. (27.50kg/vine) followed by Fiesta cv.
(25.43 kg/vine) followed by Thompson Seedless clone 2A cv. (23.97 kg/vine) while Crimson Seedless cv. gave the lowest yield (18.07 kg/vine). Also, Uddin et al., (2011) showed that the high yielding varieties were Exotic, Cardinal and Gold with respective yield of 21.67, 19.33 and 19.00 Kg/vine, while the least yielding variety was Fantasy Seedless variety (7.67 kg/vine). In addition, Lisak (2014) found that yield of ‘Muscat Bleu’ was higher in the whole examined period than all other assessed cultivars, while Favorit cv. gave the lowest yield. Also, El-Morsy et al., (2017) showed that the highest yield was obtained from Arra 15 cv. (19.83 kg/vine) followed by Arra 29 cv. (18.41 kg/vine) followed by Arra 30 cv. (17.83 kg/vine), while Arra 13 cv. gave the lowest yield (11.51 kg/vine).

**Number of clusters/vine**

Results in Table 5 show that the least number of clusters/vine was obtained with Black Rose grape cultivar, whereas Matrouh Eswed grape cultivar recorded the highest number of clusters/vine followed by Ribier grape cultivar with insignificant differences were attributed between them in both seasons.

The obtained results are in agreement with those reported by Sabry et al., (2009) they found that the highest number of clusters/vine was obtained from Black Monukka cv. (15.82 clusters/vine) followed in a descending order by Red Globe cv. (15.54 clusters/vine), then Rich Baba cv. (13.95 clusters/vine) while Queen cv. gave the lowest number of clusters/vine (13.46 clusters/vine). Also, Abd El-Wahab (2011) showed that the highest number of clusters/vine was obtained from Melissa cv. (40.06 clusters/vine) followed by Thompson Seedless clone 2A cv. (37.35 clusters/vine) followed by Crimson Seedless cv. (37.06 clusters/vine) while Fiesta cv. gave the lowest number of clusters/vine (35.38 clusters/vine). In addition, El-Morsy et al., (2017) they found that the highest number of clusters/vine was obtained from Arra 27 cv. (25.02 clusters/vine) followed by Arra 24 cv. (24.95 clusters/vine) followed by Arra 29 cv. (24.94 clusters/vine), while Arra 13 cv. gave the lowest number of clusters/vine (15.01 clusters/vine).

**Cluster weight**

Data in Table 5 found that Black Rose grape cultivar had significantly the highest cluster weight followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar resulted in significantly the least cluster weight in both seasons.

These results are in line with El-Morsy et al., (2017) they found that the average cluster weight of the all studied cultivars was big (more than 500 g) and Arra 30 was the biggest one (894.0g), while Arra 24 grape cultivar produced significantly the lowest values (653.0g). Also, Mohamed and Khairy (2017) they showed that the average bunch weight is big (628.9g) in Sable and (647.1g) in Midnight Beauty grape cultivars, whereas it is medium (472.7g) in Desert Red grape cultivar. In addition, Sharma et al., (2017) evaluated seven grape varieties; the maximum bunch weight (455.2 g) was noted in Hy 23-14-23 followed by Medika (318.6 g) and Pusa Navrang (220.0 g), while the minimum bunch weight (177.0g) for variety Country Bangalore.

**Cluster length**

Results in Table 5 clarify that the least cluster length was attained by Matrouh Eswed grape cultivar, whereas Black Rose grape cultivar induced significantly the highest cluster length followed by Ribier grape cultivar in both seasons.
These results are in accordance with Abd El-Rahman (2016) who found that Princess and Autumn Royal grape cultivars had a long bunch length (20.1 and 20.9cm) respectively. Also, El-Morsy et al., (2017) showed that the average cluster length was obtained from Arra 30 cv. (24.58cm) followed by Arra 29 cv. (24.53cm) followed by Arra 13 cv. (23.93cm), while Arra 24 cv. gave the lowest average cluster length (18.14cm). In addition, Mohamed and Khairy (2017) they found that the average bunch length is long (19.4, 21.9 and 20.7cm) for Sable, Midnight Beauty and Desert Red grape cultivars respectively.

**Cluster width**

Data in Table 5 found that Black Rose grape cultivar had significantly the highest cluster width followed by Ribier grape cultivar, while Matrouh Eswed grape cultivar attained significantly the least cluster width in both seasons.

The obtained results are in agreement with those reported by Abd El-Rahman (2016) who found that Princess and Autumn Royal grape cultivars had a big bunch width (17.8 and 18.1cm) respectively. Also, El-Morsy et al., (2017) showed that the average cluster width was obtained from Arra 30 cv. (17.48cm) followed by Arra 13 cv. (17.34cm) followed by Arra 29 cv. (17.06cm), while Arra 24 cv. gave the lowest average cluster width (11.24cm). In addition, Mohamed and Khairy (2017) found that the average bunch width is big (17.9, 18.2 and 17.4cm) for Sable, Midnight Beauty and Desert Red grape cultivars respectively.

**Number of berries**

Results in Table 5 show that the least number of clusters/vine was obtained with Ribier grape cultivar, whereas Black Rose grape cultivar recorded the highest number of clusters/vine followed by Matrouh Eswed grape cultivar in both seasons.

These results are in line with Uddin et al., (2011) they found that varieties Exotic and Cardinal had the maximum number of berries/bunch (300 berries per bunch), while minimum number of berries per bunch (172 berries per bunch) was recorded in Fantasy Seedless. Also, Fahmi et al., (2012) evaluated four grape cultivars; Italian, American, Lebanese, Syrian grape cultivars and six clones of Taify table grape cultivar. Taify (clone,) cultivar had the maximum number of berries/bunch (97 berries per cluster), while Syrian grape cultivar had the lowest one (37 berries per cluster). In addition, Sharma et al., (2017) evaluated seven grape varieties; Hy 23-14-23 was also noted for highest values of berries per bunch (72), while least values of berries per bunch (43) for variety Pusa Navrang.
Table (5): Yield and its attributes of some table grape cultivars in 2016 and 2017 seasons

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Yield/vine (kg)</th>
<th>No. of clusters</th>
<th>Cluster weight (g)</th>
<th>Cluster length (cm)</th>
<th>Cluster width (cm)</th>
<th>No. of berries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Season, 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>19.63</td>
<td>37.2</td>
<td>527.6</td>
<td>24.7</td>
<td>13.1</td>
<td>84.7</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>14.19</td>
<td>43.6</td>
<td>325.4</td>
<td>19.2</td>
<td>10.4</td>
<td>67.4</td>
</tr>
<tr>
<td>Ribier</td>
<td>13.32</td>
<td>42.7</td>
<td>311.9</td>
<td>21.4</td>
<td>10.9</td>
<td>65.1</td>
</tr>
<tr>
<td>New L.S.D. (0.05) =</td>
<td>5.41</td>
<td>1.1</td>
<td>193.2</td>
<td>3.1</td>
<td>2.1</td>
<td>17.1</td>
</tr>
<tr>
<td>Season, 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>18.59</td>
<td>34.8</td>
<td>534.2</td>
<td>25.3</td>
<td>13.5</td>
<td>86.4</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>14.33</td>
<td>43.2</td>
<td>331.7</td>
<td>19.8</td>
<td>10.7</td>
<td>69.3</td>
</tr>
<tr>
<td>Ribier</td>
<td>13.41</td>
<td>42.5</td>
<td>315.6</td>
<td>21.7</td>
<td>11.3</td>
<td>66.5</td>
</tr>
<tr>
<td>New L.S.D. (0.05) =</td>
<td>4.23</td>
<td>0.8</td>
<td>197.5</td>
<td>3.4</td>
<td>1.9</td>
<td>16.8</td>
</tr>
</tbody>
</table>

4. Physical and chemical characteristics of berries

As shown in Tables 6 & 7, it is evident from the data that, all berry attributes (expressed as berry weight, size, dimensions, and total soluble solids, total sugars, total acidity and total anthocyanin) were influenced by type of cultivar in both seasons.

**Berry weight**

Data in Table 6 show that Black Rose grape cultivar had significantly the highest berry weight followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar resulted in significantly the least berry weight in both seasons.

These results are in accordance with Abd El-Rahman (2016) who found that Princess and Autumn Royal grape cultivars had a big berry weight (4.42 and 5.63g) respectively. Also, El-Morsy et al., (2017) showed that the average berry weight was obtained from Arra 30 cv. (8.24g) followed by Arra 15 cv. (7.86g) followed by Arra 13 cv. (7.19g), while Arra 24 cv. gave the lowest average berry weight (4.92g). In addition, Mohamed and Khairy (2017) found that the average berry weight is big (4.84g) in Sable and (5.69g) in Desert Red grape cultivars, whereas it is very big (7.83g) in Midnight Beauty grape cultivar.

**Berry size**

Results in Table 6 clarify that the least berry size was attained by Ribier grape cultivar, whereas Black Rose grape cultivar induced significantly the highest berry size followed by Matrouh Eswed grape cultivar in both seasons.

The obtained results are in agreement with those reported by Abd El-Rahman (2016) who found that Princess and Autumn Royal grape cultivars had a large berry size (4.16 and 5.41cm3) respectively. Also, El-Morsy et al., (2017) showed that the average berry size was obtained from Arra 30 cv. (7.67cm3) followed by Arra 15 cv. (7.35cm3) followed by Arra 29 cv. (6.66cm3), while Arra 24 cv. gave the lowest average berry size (4.51cm3). In addition, Mohamed and Khairy (2017) found that the average berry size is large (4.45cm3) in Sable and (5.53cm3) in Desert Red grape cultivars, whereas it is very large (7.75cm3) in Midnight Beauty grape cultivar.
Berry length

Data in Table 6 found that Black Rose grape cultivar had significantly the highest berry length followed by Matrouh Eswed grape cultivar, while Ribier grape cultivar attained significantly the least berry length in both seasons.

These results are in line with El-Morsy et al., (2017) they found that the average berry length was obtained from Arra 30 cv. (3.15cm) followed by Arra 15 cv. (3.11cm) followed by Arra 13 cv. (2.83cm), while Arra 24 cv. gave the lowest average berry length (2.24cm). Also, Mohamed and Khairy (2017) showed that the average berry length is medium (2.39cm) in Sable and (5.30cm) in Desert Red grape cultivars, whereas it is long (3.04cm) in Midnight Beauty grape cultivar. In addition, Sharma et al., (2017) evaluated seven grape varieties; Hy 23-14-23 is noted for highest values of berry length (16.50 mm), while least values of berry length (12.50 mm) for variety Pusa NAVrang.

Berry diameter

Results in Table 6 show that the least berry diameter was obtained with Ribier grape cultivar, whereas Black Rose grape cultivar recorded the highest berry diameter followed by Matrouh Eswed grape cultivar in both seasons.

These results are in accordance with El-Morsy et al., (2017) they found that the average berry diameter was obtained from Arra 29 cv. (2.24cm) followed by Arra 27 cv. (2.19cm) followed by Arra 13 cv. (2.18cm), while Arra 24 cv. gave the lowest average berry diameter (2.13cm). Also, Mohamed and Khairy (2017) showed that the average berry diameter is medium (1.95cm) in Sable and (2.06cm) in Desert Red grape cultivars, whereas it is big (2.18cm) in Midnight Beauty grape cultivar. In addition, Sharma et al., (2017) evaluated seven grape varieties; Medica is noted for highest values of berry diameter (15.10 mm), while least values of berry diameter (13.60 mm) for variety Pusa NAVrang.

Table (6): Physical characteristics of berries of some table grape cultivars in 2016 and 2017 seasons

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Berry weight (g)</th>
<th>Berry size (cm³)</th>
<th>Berry length (cm)</th>
<th>Berry diameter (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Rose</td>
<td>5.83</td>
<td>5.21</td>
<td>2.46</td>
<td>1.97</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>4.52</td>
<td>4.97</td>
<td>2.19</td>
<td>1.91</td>
</tr>
<tr>
<td>Ribier</td>
<td>4.49</td>
<td>4.92</td>
<td>2.17</td>
<td>1.89</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>1.29</td>
<td>0.23</td>
<td>0.25</td>
<td>0.04</td>
</tr>
<tr>
<td>Season, 2016</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Black Rose</td>
<td>5.79</td>
<td>5.17</td>
<td>2.43</td>
<td>1.95</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>4.47</td>
<td>4.93</td>
<td>2.17</td>
<td>1.90</td>
</tr>
<tr>
<td>Ribier</td>
<td>4.45</td>
<td>4.91</td>
<td>2.16</td>
<td>1.88</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>1.31</td>
<td>0.22</td>
<td>0.23</td>
<td>0.03</td>
</tr>
<tr>
<td>Season, 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Total soluble solids (TSS)

Data in Table 7 show that Matrouh Eswed grape cultivar had significantly the highest juice TSS% followed by Ribier grape cultivar, while Black Rose grape cultivar resulted in significantly the least juice TSS% in both seasons.

The obtained results are in agreement with those reported by El-Morsy et al., (2017) they found that the highest percentages of TSS was obtained from Arra 30, Arra 29 and Arra 13 grape cultivars (16.82%), while Arra 24 cv. gave the least percentages of TSS (16.76%). Also, Mohamed and Khairy (2017) showed that the highest percentages of TSS (17.3%) for Sable grape cultivar followed by (17.0%) for Midnight Beauty grape cultivar, whereas the least percentages of TSS (16.8%) for Desert Red grape cultivar. In addition, Sharma et al., (2017) evaluated seven grape varieties; Pusa Navrang recorded maximum TSS (20.7%) which was closely followed by Country Bangalore, Medika, Arka Shyam and Hy 23-14-23 with the percentages of 20.50, 20.40, 20.30 and 20.00% respectively, while least percentages of TSS (18.2%) for variety Bangalore Purple X Gulabi.

Total acidity

Results in Table 7 clarify that the least juice acidity% was attained by Matrouh Eswed grape cultivar, whereas Black Rose grape cultivar induced significantly the highest juice acidity% followed by Ribier grape cultivar in both seasons.

These results are in line with El-Morsy et al., (2017) they found that the least percentages of acidity was obtained from Arra 13 grape cultivar (0.50%), while Arra 27 cv. gave the highest percentages of acidity (0.64%). Also, Mohamed and Khairy (2017) showed that the least percentages of acidity (0.41%) for Sable grape cultivar followed by (0.43%) for Midnight Beauty grape cultivar, whereas the highest percentages of acidity (0.47%) for Desert Red grape cultivar. In addition, Sharma et al., (2017) evaluated seven grape varieties; Medika recorded minimum total acid content (6.3g/L) followed by Arka Shyam with the value of (6.9g/L), while highest value of total acid content (9.4g/L) for variety Bangalore Purple X Gulabi.

Total sugars

Data in Table 7 found that Matrouh Eswed grape cultivar had significantly the highest juice total sugars% followed by Ribier grape cultivar with insignificant differences were attributed between them, while Black Rose grape cultivar attained significantly the least juice total sugars% in both seasons.

These results are in accordance with Kadu (2002) who evaluated 15 grape varieties, maximum total sugar content was recorded of Arkavati (24.54%) followed by that of Pinot Noir (22.48%). On the other hand, the lowest total sugar content was recorded of Pinot Meunier (16.79%).

Reducing sugars

Results in Table 7 show that the least juice reducing sugars% was obtained with Black Rose grape cultivar, whereas Matrouh Eswed grape cultivar recorded the highest juice reducing sugars% followed by Ribier grape cultivar with insignificant differences were attributed between them in both seasons.

The obtained results are in agreement with those reported by Kadu (2002) who evaluated 15 grape varieties, maximum reducing sugars content was recorded of Arkavati (23.29%) followed by that of Pinot Noir (15.37%).
Non-reducing sugars

Data in Table 7 found that Matrouh Eswed grape cultivar had significantly the highest juice Non-reducing sugars% followed by Ribier grape cultivar with insignificant differences were attributed between them, while Black Rose grape cultivar resulted in significantly the least juice Non-reducing sugars% in both seasons.

Total anthocyanin

Results in Table 7 clarify that the least berry skin total anthocyanin magnitude was attained by Matrouh Eswed grape cultivar, whereas Black Rose grape cultivar induced significantly the highest berry skin total anthocyanin magnitude followed by Ribier grape cultivar in both seasons.

These results are in line with Kadu (2002) who evaluated 15 grape varieties, the maximum anthocyanin content was recorded of Cabernet Sauvignon (100.95 mg 100 m/L), which was significantly different from others. The must of Sauvignon Blanc had the minimum of 2.02 mg 100 m/L anthocyanin, which was at par with that of Arkavati (2.75 mg 100 m/L) and Ugni Blanc (3.48 mg 100 m/L). Also, Fahmi et al et al., (2012) evaluated four grape cultivars; Italian, American, Lebanese, Syrian grape cultivars and six clones of Taify table grape cultivar. Taify (clone e) cultivar had the highest total anthocyanins content (7.4mg/100ml juice) followed by Italian cultivar (6.3mg/100ml juice), while Taify (clone d) cultivar had the lowest one (0.6mg/100ml juice).

From these findings, it can be recommended to spread Black Rose, Matrouh Eswed and Ribier grape varieties in Egypt, which its characterize good fruit quality attributes.

Table (7): Chemical characteristics of berries of some table grape cultivars in 2016 and 2017 seasons

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>TSS (%)</th>
<th>Acidity (%)</th>
<th>Total sugars (%)</th>
<th>Reducing sugars (%)</th>
<th>Non-reducing sugars (%)</th>
<th>Total anthocyanin (mg/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Season, 2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>15.5</td>
<td>0.81</td>
<td>18.54</td>
<td>13.08</td>
<td>5.46</td>
<td>124.8</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>16.4</td>
<td>0.72</td>
<td>19.23</td>
<td>13.72</td>
<td>5.51</td>
<td>95.7</td>
</tr>
<tr>
<td>Ribier</td>
<td>16.1</td>
<td>0.77</td>
<td>18.85</td>
<td>13.37</td>
<td>5.48</td>
<td>116.2</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.2</td>
<td>0.3</td>
<td>0.37</td>
<td>0.34</td>
<td>0.02</td>
<td>8.1</td>
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<tr>
<td><strong>Season, 2017</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Rose</td>
<td>15.3</td>
<td>0.84</td>
<td>18.22</td>
<td>12.81</td>
<td>5.41</td>
<td>119.3</td>
</tr>
<tr>
<td>Matrouh Eswed</td>
<td>16.1</td>
<td>0.73</td>
<td>18.75</td>
<td>13.27</td>
<td>5.48</td>
<td>86.7</td>
</tr>
<tr>
<td>Ribier</td>
<td>15.9</td>
<td>0.79</td>
<td>18.38</td>
<td>12.94</td>
<td>5.44</td>
<td>105.1</td>
</tr>
<tr>
<td>new L.S.D. (0.05) =</td>
<td>0.1</td>
<td>0.4</td>
<td>0.33</td>
<td>0.31</td>
<td>0.03</td>
<td>11.9</td>
</tr>
</tbody>
</table>
REFERENCES
Brooks, R.M. and Olmo, H.P. (1972): Register of new fruit and nut varieties 2nd Univ. of California Press. USA.


دراسات على تقييم النمو الخضري والمحصول وجودة الثمار لبعض أصناف الونب

محمد السيد مرسي عيسى، حمدي عبد النبي زكي حسن، محمد عيد العظيفي عيدالوهاب، حاتم حمد سعيد

اخرى هذا البحث لمدة موسمين متتاليين (2017-2018) في مزرعة خاصة تقع عند الكيلو 58 طرق
مصر استطاعت الصحراء لتقييم النمو الخضري والمحصول وجودة الثمار لثلاثة أصناف عنب بنزية تابعة
لمنس فينيتس فينيتزا وهي بلاك روز، مطروج أسود، ربيير. كانت عمر الكرمة 8 أعوام موزعة على مساحة
2.75 هكتار مثمرة في ربة طبيعية مملوءة وتوتي نظام الرى بالتنقيط. تم تقييم الكرمات تقليد قصبي تحت نظام
تدعي التكاثر الآسيوي. أجرى التقييم في الأسبوع الثاني من يناير لموسم الدراسة مع ترك حمولة براعم
84 عين لكل كرمة (3 قصاصات 12 عين لكل كرمة).

أشارت النتائج إلى أن عنب صنف مطروج أسود سجل أعلى القيم لصفات النمو الخضري (طول الفرع، قطر
الفرع، عدد الأوراق لكل فرع، مساحة الورقة، وزن الفاصلاء) ومتى الأوراق من الصبغات وتمتل
كلوروفيل أ، ب، والكاروتينات مثيرة بباقي الأصناف الأخرى. فيما يتعلق بمحتوى الأوراق والقاديات من
الكتوهردات الكلية والعناصر المعنوية يوجد أن عنب صنف بلاك روز أعطى أعلى زيادة معنوية في محتوى
الكرمات والاحصاءات من الكرتوهردات الكلية والعناصر المعنوية الأخرى وتشمل النتاجن و
البهباتومين بالسما بينما سجل عنب صنف مطروج أسود أعلى محتوى من الفوانيس الصغرى مثلاً في الحديد والزنك
وال(speed). أما بالنسبة للمحصول وخصائصه لوحظ أن عنب صنف البلاك روز سجلت أعلى زيادة معنوية بالنسبة
لمحصول لكل كرمة، وزن الفاصلاء، طول الفاصلاء، عدد الفاصلاء لكل فرع، زراعة عنب صنف
مطروج أسود سجل أعلى زيادة معنوية بالنسبة لعدد الفاصلا لكل كرمة، فيما يتعلق بالمحتوى الاسمائي للقاديات وال الإلكترونيات
للقاديات فقد لوحظ أن عنب صنف بلاك روز سجلت أعلى زيادة معنوية بالنسبة إلى الثلاثة عالياً بخصائص
ور لنسبة الهواء. عرض الجهة بينما عنب صنف مطروج أسود سجل أفضل النتائج بالنسبة للمحاص
الكماوية للقاديات ما منعح وضع الفاصلا لصدغة الأندوسينات، ولم وصل هذه الصدافب أعلى زيادة معنوية في كل مات
النسبة النموية للمواد الصلبة الزائدة الكلية، السكريات الكلية، السكريات المختزلة وغير المختزلة وأكل زيادة معنوية
في النسبة النموية للمحاص. ومن ناحية أخرى سجل عنب صنف البلاك روز أعلى زيادة معنوية بنسبة لصيحة
الأندوسينات في فترة الجهة.

الكلمات الدالة: عنب، بلاك روز، مطروج أسود، ربيير.

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